

## **Abstract:**

Transdermal drug delivery using microneedles through skin has several advantages over parenteral and oral routes. But the biggest challenge for drug delivery through microneedles is their costly manufacturing techniques and sometimes it may also demand patient-specific designs as well as particular manufacturing. In this study, I described a simple and low-cost fabrication method. The solid microneedles of copper were fabricated by using chemical etching method. The key links between the etching parameters and microneedles design as well as quality are thoroughly investigated. ANSYS software was used for transverse analysis and to test the mechanical behavior of solid copper microneedle. The simulation exhibited encouraging results and did not imply a mode of mechanical breakdown at given boundary conditions. The fabricated copper microneedles were characterized by scanning electron microscopy (SEM). The SEM results demonstrated that fabricated solid microneedles of copper have the tip diameter of 10 $\mu$ m and 55 $\mu$ m, and are appropriate for transdermal drug delivery uses.